

# **Perfect City**

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- Cars are great but...
- Transit is not the answer
- Automated highways are not the answer
- What is needed
- Car-free community concept
- Advantages
- Hurdles
- Conclusions



# **Cars are great**

- But
  - They are ruining our cities





# **Vehicle miles traveled**



Source: USDOT National Transportation Statistics 2009



# **Delay & logistics**



Source: USDOT National Transportation Statistics 2009



# Safety

- 41,059 highway deaths in 2007
- Compares with:
  - 58,236 total US deaths in Vietnam War
  - -2,973 killed on 9/11



Sources: USDOT: National Transportation Statistics 2009 Wikipedia



# **Sustainability**

- Transportation
  - 47% of net increase in total US emissions since 1990
  - 34% of greenhouse gases
  - Uses more oil than all other uses combined



Sources: US Environmental Protection Agency USDOT: National Transportation Statistics 2009



# **Cars devour property**

#### 48% of land in the Arapahoe Road corridor



Source: PRT Consulting Highways 20%, Streets 7%, Parking 21%



### **Transit is no solution**

- Nobody likes to use it
- 1989 to 2007 transit mode share barely increased from 4.6% to 4.9%



Source: USDOT: National Transportation Statistics 2009



#### Automated highways not the answer

- Very difficult
  - Automated systems attract high safety standards
  - Where the rubber meets the road
  - Incursions people, animals, tumbleweeds
  - Speed
  - Transition to automation
- Problems not solved
  - Real estate
  - Severance
  - Resources



# What is needed

- Transit that
  - waits for you
  - always provides a seat
  - is non-stop
  - has short walking distances



# And...

- A public transit system that
  - Attracts drivers from their cars
  - Is 100 times safer than cars
  - Uses less energy than other systems
  - Has low infrastructure needs
  - Can also carry freight
  - Is economical to operate





### Personal rapid transit (PRT)

- Driverless vehicles on a guideway
- One to four seated passengers plus luggage
- Direct origin to destination service
  - No transfers or stops
- Service on demand not scheduled
- Very short headways (seconds)





# **Comparison of positive impacts**

	High speed Rail	Light & Commuter Rail	Street Cars	Demand Management	Hybrid cars	Electric cars	Automated Highways	PRT
Accidents	1	1	0	0	0	0	2	2
Congestion	0	1	0	1	0	0	0	2
Energy use	0	0	0	1	1	2	1	2
Cost	0	0	0	0	0	0	0	1
GHG	1	1	1	1	1	2	2	2
Logistics	1	0	0	1	0	0	1	1
Severence	0	0	0	1	0	0	0	2
Real estate	0	1	0	0	0	0	1	2
Walkability	0	1	2	1	0	0	0	2

No positive impact Some positive impact Significant positive impact





# Vision

• Vision:

Sustainable communities with exceptionally attractive living environments for all





#### **Car-free community concept**

- No cars, trucks or busses
- Dense PRT network
- A station for every building
- PRT system links to peripheral parking lots and transit
- Freight vehicles carry up to 10'x4'x6'
- Refuse & mail on PRT system



#### **Car-free community concept**

- All buildings are sprinkled with built-in ladders
- Emergency responders use speciallyequipped T-Pods
- Special delivery by low-impact vehicles
- Home automobile access by special permit
- All T-Pods under CCTV surveillance



# **Guideway Concepts**













# **Building Station**









# **2getthere Freight vehicle**





# **Advantages**

- Sustainable
- Worth more, yet cost less to build and operate
- Peaceful, park-like cities
- No cars, congestion or pollution





# Advantages continued

- Low-crime environment
- Improved health, wealth and safety
- Reduced carbon footprint



### **Sustainable**

- 1/3<sup>rd</sup> energy per passenger mile
- Battery-power conducive to intermittent (wind & solar) power sources
- Buildings to LEED standards





# Cost less to build & operate

- PRT cost more than offset by cost of roads, parking and garages
- Reduced auto accidents & crime reduces response costs
- Small infrastructure carries light loads and is cost-effective to maintain





# Low crime rate

- PRT system extensively CCTV monitored
- Getaway cars unavailable
- Kidnapping is much more difficult
- Existing systems are very secure<sup>1</sup>







#### **Improve** health

- Elimination of local auto emissions
- Entire outdoors a safe environment for walking, biking and playing





# Improve wealth

- Good transit access results in
  - Commercial land value premiums of
    - 24% to 103% in Santa Clara County
    - -4% to 38% in San Diego County
  - And residential housing value premiums of
    - 20% in Chicago
    - 24% in Dallas
    - 45% in Santa Clara County

Source: TCRP Report 102 Transportation Research Board





### Improve wealth even more

- Location, location, location
  - Better than living on golf course or cul-de-sac
  - Easy access to schools, shops, amenities
  - No homes on busy streets
- Eliminating one car saves
   \$7,086 \$11,473 annually<sup>1</sup>
- Every mile by PRT instead of car saves about \$0.25

<sup>1</sup>Source: AAA (based on \$2.30/gal gasoline)





#### **Improve safety**

- The Morgantown PRT system has completed over 140M injury-free passenger miles
- So far it is about one hundred times safer than conventional transit<sup>1</sup>



<sup>1</sup>Source: Muller, P.J. TRB Paper # 07-0907



#### **Importance of housing & location attributes**

Housing/location attributes	Mean score <sup>1</sup>	Positive impact
Price	3.72	<b>I</b>
Attractive neighborhood appearance	3.59	<b></b>
Investment potential or resale	3.40	<b></b>
Perception of crime rate in the neighborhood	3.36	<b>I</b>
Number of bedrooms	3.29	
Commute time to work (or school for full-time students)	3.12	<b></b>
Noise levels	3.08	<b></b>
Lot size / yard size	2.86	
Access to major freeway(s)	2.70	
Social composition of the neighborhood	2.69	

1 = not at all important; 4 = very important

Source: University of Texas, survey of over 900 recent homebuyers in Austin, TX



#### **Importance of housing & location attributes**

Housing/location attributes	Mean score <sup>1</sup>	Positive impact
Distance/travel time to shopping	2.53	<b>I</b>
Quality of local public schools	2.52	<b></b>
Views	2.49	<b>~</b>
Neighborhood amenities / recreational facilities	2.45	
Closeness to friends or relatives	2.25	<b>I</b>
Distance to medical services	2.11	<b>I</b>
Distance to local public schools	2.04	<b>~</b>
Access to bus services	1.57	<b></b>
Physical disability accommodations	1.47	<b></b>

1 = not at all important; 4 = very important

Source: University of Texas, survey of over 900 recent homebuyers in Austin, TX



# Importance of commute time

 People will pay \$4,700 more for a house per minute of commute time saved



Source: University of Texas, survey of over 900 recent homebuyers in Austin, TX



### Hurdles to be overcome

- Inertia
  - Building & zoning codes
  - General fear of change
- Lack of prior examples
- Problems with PRT
  - Prior failures
  - Present delays & rumors
- Small demonstration not feasible
- Technology hurdles



# Conclusions

- Numerous advantages appear to outweigh hurdles
- Large home developers could benefit substantially
- Living & working in an urban park-like setting may be possible for many



# Conclusions

Wouldn't a city where people:
– Live & work in a park-like setting
– Have increased well-being
– Have less crime & pollution

be almost perfect?





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